APPENDIX E

DATA COMMUNICATION

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APPENDIX E

Data Communication

E.1 General. Data communication is the transfer of information from one activity to another using data communication channels.

NOTE: Objective Supply Capability (OSC) has undergone a name change and is now called the Standard Army Retail Supply System-Gateway (SARSS-GW). All references to OSC and gateway have been changed or refer to SARSS-GW.

a. The Unit Level Logistics System (ULLS), and Standard Army Maintenance System-Level-1 (SAMS-1) have the capability to upload (send) supply transactions from a personal computer (PC) to the SARSS-GW.

b. The ULLS and SAMS-1 download (receive) response messages from the SARSS-GW.

(1) Telephone lines carry data from the standard Army management information system (STAMIS) through a terminal access controller (TAC) or terminal server to the SARSS-GW.

(2) The data is transmitted through the defense information service network (DISN).

(3) The process runs in reverse for data coming from the SARSS-GW.

c. Data communication contains three basic system components:

(1) Sender, which consists of each STAMIS and the SARSS-GW.

(2) Transmission medium, which consists of media used to transmit data.

(3) Receiver, which consists of each STAMIS and the SARSS-GW.

E.1.1 SARSS-GW Interface. An interface links two or more pieces of equipment. Interface specifications contain the following three components:

a. Mechanical, for the matching plugs and sockets.

b. Electrical, for the correct number of wires carrying correct signals at the proper time.

c. Protocols, for the data transfer. SARSS-GW currently uses blocked asynchronous transmission (BLAST).

E.1.2 DISN. The DISN is a transmission medium. Telephone lines and a terminal server provide each SARSS-GW user access to the DISN.

E.1.3 Terminal Server. Each operator or manager must request access to the terminal server through the installation's ISSO. A DISN TAC access card is not required to access a terminal server. See appendix C for procedures to acquire these items.

E.1.4 Modem. A modem is a modulator/demodulator. A computer sends digital data to a modem where it is modulated. The modem sends analog data through the telephone lines to another modem where it is demodulated and sent to a computer as digital data. An interface is established when one computer sends data through its modem to a modem at another computer for processing. The modem must dial and answer automatically using the Hayes command set and be able to dial a terminal server over standard telephone systems.

a. Baud rate: Baud rate is the speed at which data transmits. Older modems transmitted at one bit per second (bps). Newer, 56,000-bps modems, use a 2400-character-per-second (cps) carrier with four bits per cycle.

b. Modem limitations: The sending modem is limited to the baud rate of the receiving modem. For example, a 56,000-baud modem sends data at 14,000 baud if the receiving modem is limited to 14,000 baud. The modem at the terminal server may limit transmission to a specific baud rate.

c. Data line limitations: Data transmission is limited to the phone line transmission rate regardless of the modem's baud rate. Most SARSS-GW interfaces use military and commercial telephone lines. Some phone lines, especially those outside the continental United States (OCONUS), are saturated and thereby limit transmission rates.

E.1.5 Modem Troubleshooting. If you encounter problems while attempting a session, use the troubleshooting procedures outlined in the modem's reference manual.

a. In every case, check to make sure the modem is plugged in to both the power and phone wall jack, turned on, and properly configured.

b. If you do not connect with the SARSS-GW, the problem is local. Ensure that the local terminal server is operational.

c. Line noise and other things can sometimes cause improper initialization strings to be sent to the modem. To clear the modem, turn it off for at least 10 seconds and then turn it on. Then, log out of the application and reboot the PC. Retry the communication session.

d. It may be necessary to reset defaults in your modem. To reset defaults, you must:

(1) Enter BLAST.

(2) Move the cursor to Online and press <Enter>.

(3) Move the cursor to Terminal and press <Enter>.

(4) Type "at&f" and press <Enter>. BLAST responds OK.

(5) Type "at&w" and press <Enter>. BLAST responds OK.

(6) Hold down <Ctrl> and press <K> twice.

(7) Press <Esc> three times to exit BLAST.

e. Some problems that may occur and possible corrective actions are listed in table E.6.2.

Table E.6-2
Modem Troubleshooting

Problems	Corrective Actions
Garbled data on the screen or no response from the modem.	Make sure the parameters are set to 8 bits, no parity, 1 stop bit (8-N-1). Make sure your terminal emulation is set to VT-100. Make sure the phone cable from the modem line connector to the wall jack is properly connected and in good condition. Replace if necessary. Make sure the modem is not near or on the same electrical circuit as a color TV, electric motor, or other electric noise source. Make sure all other phones and phone instruments on the same line are not off the hook. Make sure the modem is connected to the correct serial port. Make sure the PC is configured for the type modem in use. When in doubt, select Hayes-compatible. Retry the session. Also, the terminal server may be down. Retry later.
Modem does not dial.	Check to see if the modem power supply is plugged into an electrical power source. For internal modems, you may need to reset the CMOS setup. Check the baud rate setting. If you have a 2400-baud modem and your baud rate is set to 4800, 9600, or higher, it will probably not dial. Check all connections, turn off the modem for 10 seconds, turn it on, and reboot your PC. Make sure BLAST is set for the correct communication (serial) port. Internal modems are normally set to COM2.
Modem dials but cannot connect.	Make sure the phone cable is connected from the wall jack to the Line connector on the modem, not the Phone connector. Make sure the wall jack is operational. Connect the cable to a telephone and try to dial a number to make sure the line works. Retry the session.
TAC or terminal server phone numbers are all busy.	Initialization commands sent to the modem may be wrong. Turn off the modem, wait 10 seconds, turn on the modem, reboot the computer, and try again.
Line drops during session.	The local TAC or terminal server may be timing out. Allow BLAST to attempt to reconnect you. Do not abort the session. High-speed modems are very sensitive to line noise. Lower the baud rate and retry the session. Have the telephone lines checked for a good transmission baud rate. Check your user manual for the computers serial port chip. The 16450 chip set will only transfer data up to 9600 baud. If you use a 14,400-baud modem, you may have problems.

E.2 ULLS / SAMS.

E.2.1 SARSS-GW Communication. SARSS-GW uses the BLAST series of communication software to provide fast, error-free data transfer between your PC and the SARSS-GW.

a. Distribution: BLAST is distributed and updated with the STAMIS software change package (SCP) or interim change package (ICP). The Version Description Document (VDD) contains installation instructions.

b. Software: A number of files are used to send and receive SARSS-GW data. The software translates BLAST script file data and uses BLAST to send the script and initiate remote commands at the SARSS-GW. The remote commands at the SARSS-GW start processes that add to and extract data from the SARSS-GW database.

E.2.1.1 BLAST Script Files. BLAST script files control SARSS-GW data communication. BLAST script files reside in the BLAST or OSC directory of your PC. Identify them by the file extension .SCR.

a. Scripts are pre-written instructions BLAST uses to automatically perform tasks such as dialing remote systems, setting communication parameters, transferring files, and getting information to and from the SARSS-GW.

b. BLAST uses two pre-defined script libraries: MODEMS.SCR and SYSTEMS.SCR. These program libraries provide the information BLAST needs to control the modem and log on to another computer. These libraries are standardized and require no modification.

c. The second type of BLAST scripts are those that automate the SARSS-GW interface. These scripts are in text form, making them easy to read and print; however, they should not require modification unless directed by the technical proponent.

d. Communication between computers requires a great deal of information: the phone number, the modem type and baud rate, and basic communication parameters. BLAST keeps this data in individual files, one for each different communication session. SARSS-GW is a communication session. The files are referred to as setups and identified by the file extension .SU in the BLAST or OSC directory. BLAST is distributed with the OSC setup already created. You must run the STAMIS application parameter update process to set specific

values; otherwise, default values are applied and may not work with your communication session.

E.2.1.2 BLAST Abort Conditions. The BLAST process may abort for various reasons during data communication. Abnormal terminations generate a particular error code or message. Use the error code or message to determine the probable cause and corrective action.

a. BLAST failures: Do not attempt to kill a transmission session because of a data communication failure or any other failure. BLAST attempts to reestablish the connection and continue to send the file until it exhausts the specified number of re-tries. Be patient, this may take a few seconds.

b. BLAST error conditions: When a corrective action does not work, contact the STAMIS developer through the Fort Lee customer assistance office (AO) at direct switching network (DSN) 687-1051/1230.

c. Hardware error conditions: SARSS-GW users may contact the Directorate of Information Management (DOIM) or other local activities to help correct hardware errors. Follow local procedures.

d. Abnormal log-off conditions: When terminating a SARSS-GW session under normal conditions, BLAST automatically sends control codes. These codes end the session, log off, and hang up. When a SARSS-GW session terminates abnormally, the connection through the terminal server and DISN may still exist. Retry the session as soon as possible using the same terminal server telephone number and log off properly.

E.2.1.3 BLAST Error Codes. Table E.7-1 shows a list of BLAST Error Codes and a brief description of the cause of each error.

Table E.7-1
BLAST Error Codes and Descriptions

Codes	Descriptions
21	Log-on time-out. BLAST did not connect in the transfer mode within the time specified by the log-on time-out. Time-outs happen if there is excessive noise on the line, if there are parity or data/stop bit mismatches, if BLAST terminates unexpectedly, or if the connection is lost. Log-on time-out is set during setup for the particular session. The default value is 120 seconds.
22	Console interrupt. The session was terminated by the operator. The attention key is identified during setup for the particular session. The default value is ^K or <Ctrl><K>.
23	Connection time-out. BLAST lost communication during a file transfer. The connection time-out defines the time, in seconds, that BLAST stays connected after it receives the last valid data packet. Time-outs happen if the connection is lost, if there is excessive noise on the line, if the SARSS-GW goes down, or if flow control has not been released. The default value is 120 seconds.
24	Error in processing command file. Command files contain functions performed during a BLAST file transfer. The command file for the session may be corrupt.
25	Cannot connect to the host. The TAC, terminal server, or host may be down. Retry the session at a later time.
26	Host disconnect. The host system timed out during a BLAST transfer or the host operator aborted the session.
27	Attempt to connect with an incompatible private network. Special versions of BLAST are limited to use within a particular network. Use of these special versions outside of the network or use of a standard BLAST version within a network results in this error code.
29	Connection control string time-out.
31	File not found or cannot be accessed.
32	File cannot be created.
33	File cannot be deleted.
34	Error occurred while closing file.

Table E.7-1
BLAST Error Codes and Descriptions

Codes	Descriptions
35	Cannot position within the file.
36	Error occurred while reading file.
37	Error occurred while writing file. This error commonly occurs when you run out of disk space, but other causes may be at fault including hardware failure and bad disk sectors.
38	Size conflict.
39	File name is too long or invalid.
40	A file already exists with that name.
41	Error reading file directory.
48	Permission denied. Your user profile on a multi-user system or the file attributes do not allow BLAST to do that operation. Typically, this is writing, creating, or deleting a file, but it may include renaming, reading, printing, or displaying a file.
49	Transfer not allowed.
51	Error opening a data file.
52	Error creating a data file. The permissions on both the current directory and the user directory must have read and write specified for any BLAST user.
53	Error deleting a data file.
54	Error closing a data file.
55	Error positioning within a data file.
56	Error reading from a data file.
57	Error writing to a data file.
58	Error in the size of a data file.
59	Error renaming a data file.
60	Directory specified in environment is invalid.
90	Error processing a command file. Syntax error in a BLAST script file. Users should never edit a BLAST script file. If you insist, please copy the file to diskette before you modify it. Then, you can copy the original back to the OSC or BLAST directory if you receive error 90 as a result of your modified file.
100	Error allocating memory from the BLAST memory pool.

Table E.7-1
BLAST Error Codes and Descriptions

Codes	Descriptions
101	Environment variable Term is too large.
102	Cannot extract control strings from TERMINFO database. The Term environment variable is not defined or the specified terminal type in Term is incorrect.
103	TERMINFO control string is too large.
104	Environment variable Term is empty.
105	Error allocating memory from the system.
108	Cannot load specific setup file. The SARSS-GW setup file does not exist in BLAST or SARSS-GW as specified by the SETUPDIR environment variable. Often, SETUPDIR is defined incorrectly.
109	Error in processing translate table update file.
110	Usage error. By using command line switches, you may start BLAST with an automated function. With SARSS-GW, BLAST automatically loads a setup and runs a BLAST script, bringing you directly into a communication session.
111	Cannot execute a child process. A child process runs within its parent process.
112	Error creating a pipe.
118	Cannot open the console port.
120	Cannot open the communication port. You may have picked an invalid communication port. Refer to the user manual. The port may be in use by another device (IRQ conflict). Assign the modem to another port.
121	A lock file exists for the communication port.
122	Error in terminal definition.
127	Control pipe input/output error.
128	Unexpected signal.
144	UNIX signal. Signal number is determined by subtracting 128 from the BLAST error number. This corresponds to UNIX signals 1-16.
210	Compression error. This should never occur.
253	Internal error.

a. Error messages for most versions of BLAST are included in this list. Some of these codes may not apply to the BLAST version running on your computer.

b. The error codes and descriptions in the table are to assist you in determining the cause of the error. There are too many variables to determine corrective action.

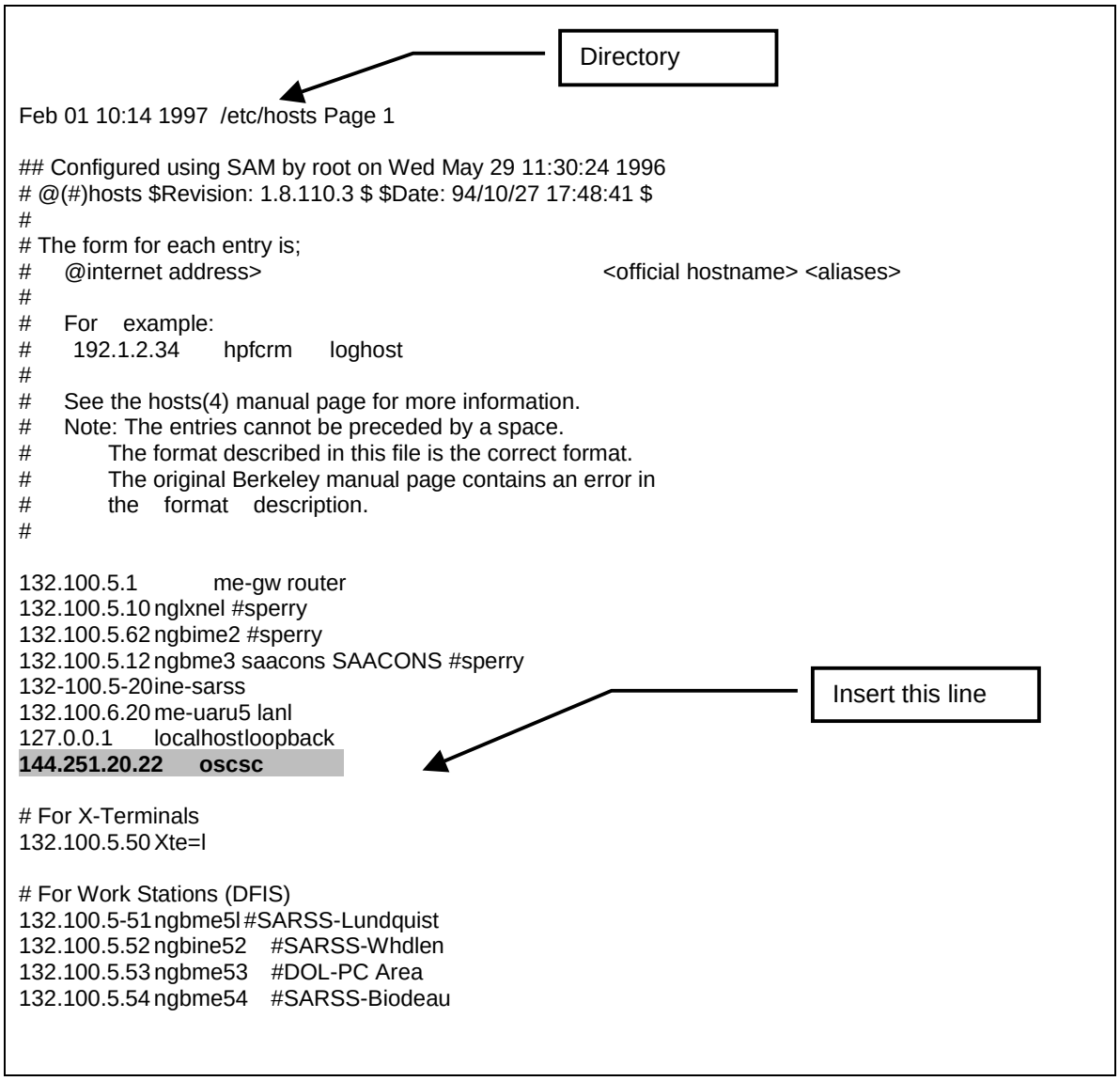
(1) Use the BLAST PC User Manual (# 700) and BLAST Reference Manual (# 701) to determine corrective action.

(2) Contact your local DOIM or maintenance personnel to assist in corrective action, or contact the Fort Lee CAO at DSN 687-1051/1230 or commercial (804) 734-1051/1230.

E.3 SARSS. In communicating with the Gateway, the SARSS uses a TCP / IP Socket connection to the Gateway.

E.3.1 Files. Most sites have the needed files and queues to activate SARSS-GW access and data movement. Site dependent information, e.g., Pseudo DODACC, OSC host 1P and name, need to be identified before starting OSC activation. Once on site, the machine IP address and name must be confirmed and you must ensure that ports 3004 and 4004 are open. Use the command “uname –n” to check the name. OSC files, tables, system directory structure and startup/shutdown scripts need to be checked as described below.

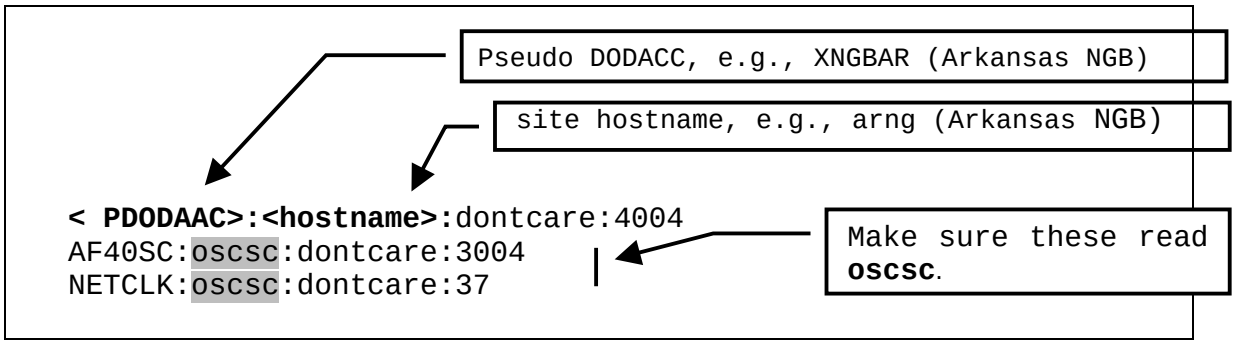
E.3.2 Host File. The first step is to add a line to the hosts file in the directory "etc" identifying the IP address and name of the Gateway computer (144.251.20.22 oscsc) as in the following example. (file shortened).



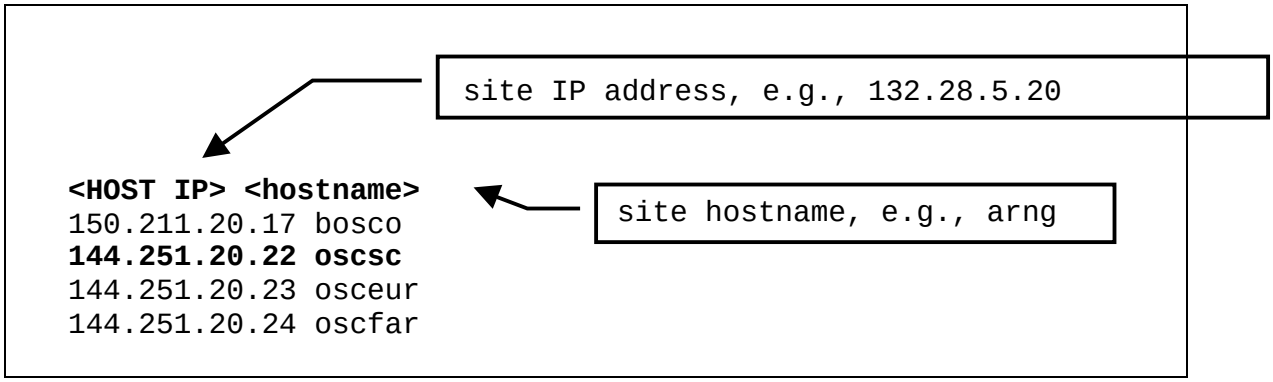

```
Feb 01 10:14 1997  /etc/hosts Page 1

## Configured using SAM by root on Wed May 29 11:30:24 1996
# @(#)hosts $Revision: 1.8.110.3 $ $Date: 94/10/27 17:48:41 $
#
# The form for each entry is;
#     @internet address>                                    <official hostname> <aliases>
#
#     For    example:
#      192.1.2.34       hpfcrm      loghost
#
#     See the hosts(4) manual page for more information.
#     Note: The entries cannot be preceded by a space.
#           The format described in this file is the correct format.
#           The original Berkeley manual page contains an error in
#           the    format    description.
#

132.100.5.1           me-gw router
132.100.5.10 nglxnel #sperry
132.100.5.62 ngbime2 #sperry
132.100.5.12 ngbme3 saacons SAACONS #sperry
132-100.5-20 ine-sarss
132.100.6.20 me-uaru5 lanl
127.0.0.1       localhostloopback
144.251.20.22      oscsc

# For X-Terminals
132.100.5.50 Xte=l

# For Work Stations (DFIS)
132.100.5-51 ngbme5l #SARSS-Lundquist
132.100.5.52 ngbine52    #SARSS-Whdlen
132.100.5.53 ngbme53    #DOL-PC Area
132.100.5.54 ngbme54    #SARSS-Biodeau
```

E.3.3 Configuration Files. These files include the 'Progs', 'Thosts', and 'Config' files that are located in the SARSS directory '/opt/ajp/cfg'. The filenames are ajp87fOl.dat, ajp87f02.dat, and ajp87f03.dat respectively. The content of each file is given below.

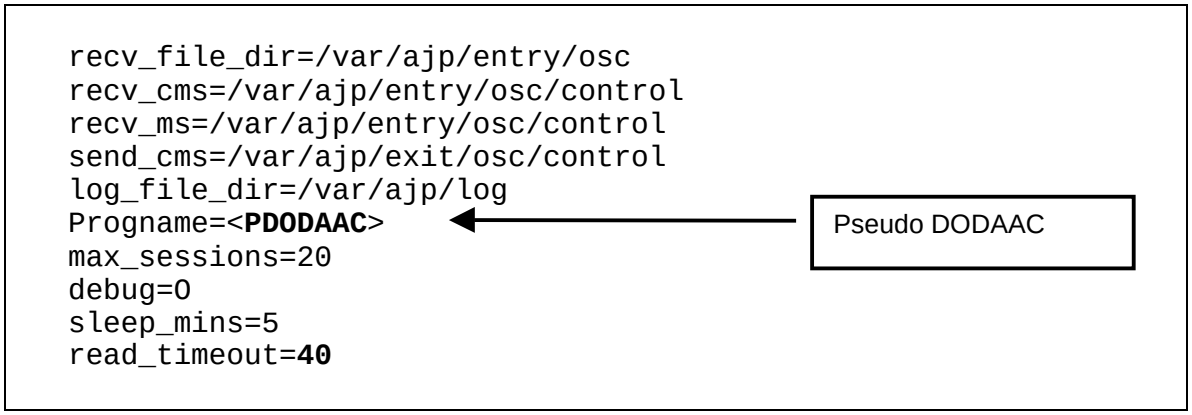
* Progs file (ajp87f0l.dat)



* Thosts file (ajp87f02.dat)



* Config file (ajp87f03.dat)

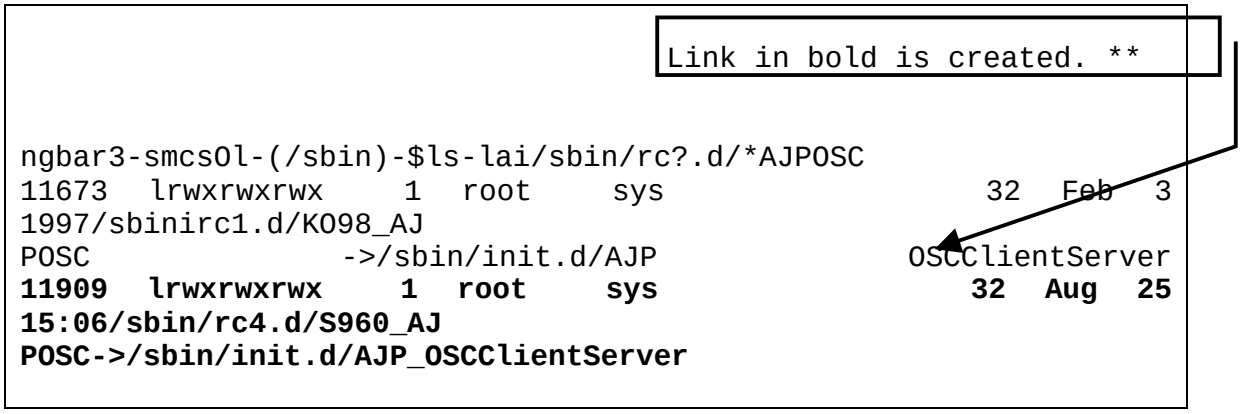


E.3.4 Links. In the /sbin/init.d/ directory create this link to the OSCClient Server using the following command.

cd to /sbin/rc4.d

ln -s /sbin/init.d/AJP_OSCClientServer /sbin/rc4.d/S960_AJPOSC

(ln -s <from><to>)



E.3.5 Permissions and Ownership on SARSS Executables. The files are under the '/opt/ajp/bin' directory. They are ajp87p10, ajp87p20, and ajp87p30. Set permissions to 6555 (chmod 6555 ajp87p[123]0).

E.3.6 Client Server. To turn on the OSC Client Server, the DPI performs the following.

a. Go to the root directory

/sbin/init.d/

b. Once there, type “AJP_OSCClientServer start” and enter.

E.3.7 SARSS Tables. The AJPNET tables that are affected by OSC activation are the router, address, and media tables. These tables can be accessed through the AJPNET Menus under 'Communications Control'. Entries for the specific tables are given below.

* Routing Table entries.

Site Primary RIC (2AC)

CORPS (OUTBOUND) TO OSC.

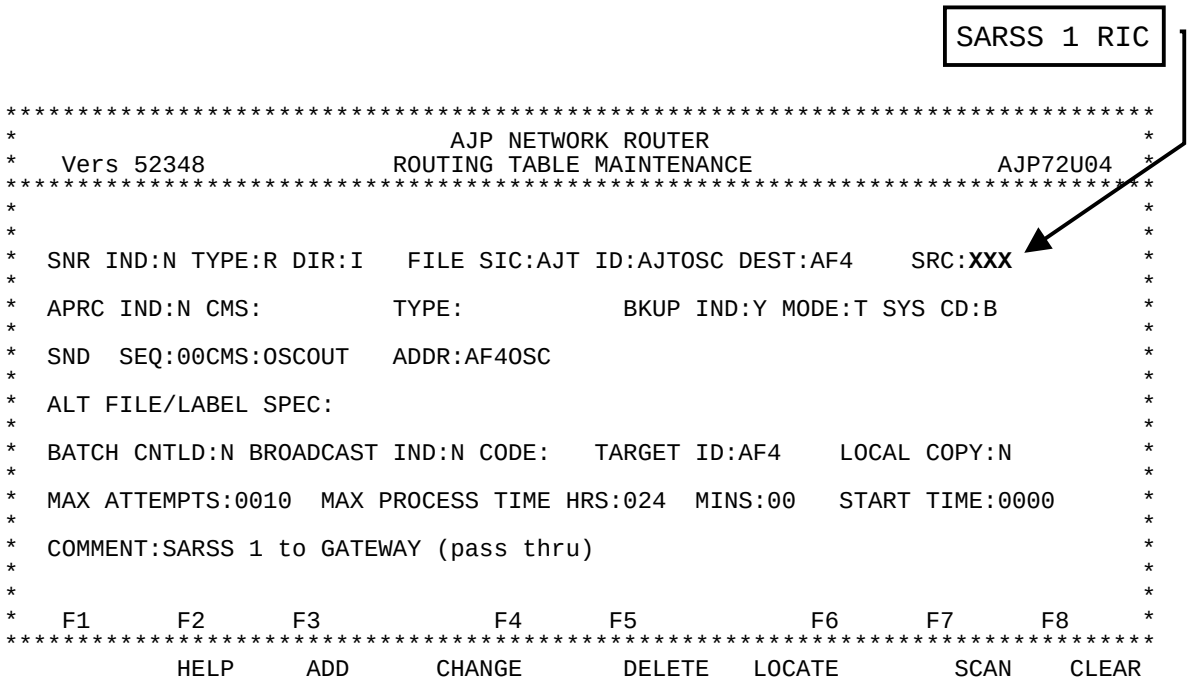
```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348             ROUTING TABLE MAINTENANCE                AJP72U04  *
*******************************************************************************
*                                                                             *
*                                                                             *
*  SNR IND:N TYPE:R DIR:O   FILE SIC:AJU ID:AJUOSC DEST:AF4    SRC:WK4        *
*                                                                             *
*  APRC IND:N CMS:         TYPE:           BKUP IND:Y MODE:T SYS CD:B         *
*                                                                             *
*  SND  SEQ:00CMS:OSCOUT   ADDR:AF4OSC                                        *
*                                                                             *
*  ALT FILE/LABEL SPEC:                                                       *
*                                                                             *
*  BATCH CNTLD:N BROADCAST IND:N CODE:   TARGET ID:       LOCAL COPY:N        *
*                                                                             *
*  MAX ATTEMPTS:0010  MAX PROCESS TIME HRS:024  MINS:00   START TIME:0000     *
*                                                                             *
*  COMMENT: CTASC to OSC Gateway                                              *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD      CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

CORPS (INBOUND) FROM OSC.

First 3 positions of Pseudo DODAAC

```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348             ROUTING TABLE MAINTENANCE                AJP72U04  *
*******************************************************************************
*                                                                             *
*                                                                             *
*  SNR IND:N TYPE:R DIR:I   FILE SIC:AJP ID:AJPOSC DEST:XNG    SRC:AF4        *
*                                                                             *
*  APRC IND:Y CMS:AJV70P   TYPE:AJPCONV    BKUP IND:Y MODE:T SYS CD:B         *
*                                                                             *
*  SND  SEQ:00CMS:AJV34P   ADDR:                                              *
*                                                                             *
*  ALT FILE/LABEL SPEC:                                                       *
*                                                                             *
*  BATCH CNTLD:N BROADCAST IND:N CODE:   TARGET ID:AF4    LOCAL COPY:N        *
*                                                                             *
*  MAX ATTEMPTS:0010  MAX PROCESS TIME HRS:024  MINS:00   START TIME:0000     *
*                                                                             *
*  COMMENT:GATEWAY to SARSS                                                   *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD      CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

SARSS 1 pass thru to gateway
(one for each SARSS 1)



ADDRESS TABLES (sequence numbers may be different)

```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348               ADDR TABLE MAINTENANCE                 AJP72U01  *
*******************************************************************************
*                                                                             *
*                                                                             *
*                        RECORD SEQ :   04                                    *
*                                                                             *
*                        SIC/ADDRESS :  AF4                                   *
*                                                                             *
*                                                                             *
*                                                                             *
*             07 RECORDS : 1 SIC RECORD AND 6 ADDRESS RECORDS                 *
*                                                                             *
*                      RECORD SEQ:   00       SIC RECORD                     *
*                                                                             *
*                      RECORD SEQ:   01       PRIME ADDRESS                  *
*                                                                             *
*                      RECORD SEQ:   02-07    ALTERNATE ADDRESS              *
*                                                                             *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD    CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348               ADDR TABLE MAINTENANCE                 AJP72U01  *
*******************************************************************************
*                                                                             *
*                                                                             *
*                        RECORD SEQ :   05                                    *
*                                                                             *
*                        SIC/ADDRESS :  XNG                                   *
*                                                                             *
*                                                                             *
*                                                                             *
*             07 RECORDS : 1 SIC RECORD AND 6 ADDRESS RECORDS                 *
*                                                                             *
*                      RECORD SEQ:   00       SIC RECORD                     *
*                                                                             *
*                      RECORD SEQ:   01       PRIME ADDRESS                  *
*                                                                             *
*                      RECORD SEQ:   02-07    ALTERNATE ADDRESS              *
*                                                                             *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD    CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

NOTE: Record Sequence continues from existing records.

CMS TABLES (should already be present)

```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348               CMS TABLE MAINTENANCE                 AJP72U03  *
*******************************************************************************
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*   CMS SERVICE NAME.......:  OSCIN                                           *
*                                                                             *
*   CMS QUEUE/CONTROL PATH.:  /var/ajp/entry/osc/control                      *
*                                                                             *
*   CMS DELIVERY PATH......:  /var/ajp/entry/osc                              *
*                                                                             *
*   COMMENT................:  INPUT OSC DIRECTORY BASED ON CMS                 *
*                                                                             *
*                                                                             *
*                                                                             *
*                                50 RECORDS MAX                               *
*                                                                             *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD    CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

```
*******************************************************************************
*                              AJP NETWORK ROUTER                             *
*   Vers 52348               CMS TABLE MAINTENANCE                 AJP72U03  *
*******************************************************************************
*                                                                             *
*                                                                             *
*                                                                             *
*                                                                             *
*   CMS SERVICE NAME.......:  OSCOUT                                          *
*                                                                             *
*   CMS QUEUE/CONTROL PATH.:  /var/ajp/exit/osc/control                       *
*                                                                             *
*   CMS DELIVERY PATH......:  /var/ajp/exit/osc                               *
*                                                                             *
*   COMMENT................:  INPUT OSC DIRECTORY BASED ON CMS                 *
*                                                                             *
*                                                                             *
*                                                                             *
*                                50 RECORDS MAX                               *
*                                                                             *
*                                                                             *
*                                                                             *
*   F1      F2      F3            F4      F5            F6      F7      F8    *
*******************************************************************************
            HELP     ADD    CHANGE       DELETE   LOCATE        SCAN    CLEAR
```

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